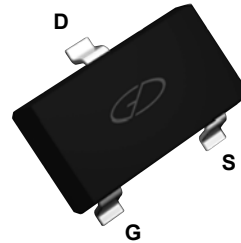
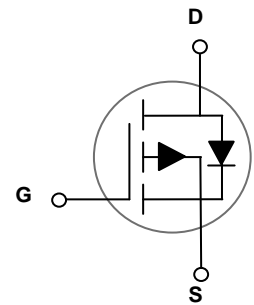


### Main Product Characteristics

|              |               |
|--------------|---------------|
| $V_{DS}$     | -30V          |
| $R_{DS(ON)}$ | 130m $\Omega$ |
| $I_D$        | -2A           |



SOT-23



Schematic Diagram

### Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



### Description

The SSF2303 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter  | Symbol          | Value       | Unit               |
|--|-----------------|-------------|--------------------|
| Drain-Source Voltage                                 | $V_{DS}$        | -30         | V                  |
| Gate-Source Voltage                                  | $V_{GS}$        | $\pm 20$    | V                  |
| Drain Current-Continuous                             | $I_D$           | -2.0        | A                  |
| Drain Current-Pulsed <sup>1</sup>                    | $I_{DM}$        | -10         | A                  |
| Maximum Power Dissipation                            | $P_D$           | 1.0         | W                  |
| Operating Junction and Storage Temperature Range     | $T_J, T_{STG}$  | -55 To +150 | $^\circ\text{C}$   |
| Thermal Resistance, Junction-to-Ambient <sup>2</sup> | $R_{\theta JA}$ | 125         | $^\circ\text{C/W}$ |

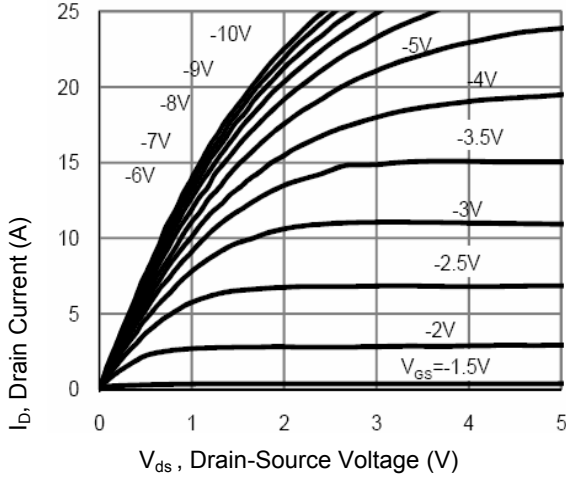
### Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise specified)

| Parameter                                    | Symbol       | Conditions  | Min. | Typ. | Max.      | Unit       |
|--|--------------|---|------|------|-----------|------------|
| <b>Off Characteristics</b>                   |              |   |      |      |           |            |
| Drain-Source Breakdown Voltage               | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$                                | -30  | -33  | -         | V          |
| Zero Gate Voltage Drain Current              | $I_{DSS}$    | $V_{DS}=-30V, V_{GS}=0V$                                  | -    | -    | -1        | $\mu A$    |
| Gate-Body Leakage Current                    | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$                               | -    | -    | $\pm 100$ | nA         |
| <b>On Characteristics<sup>3</sup></b>        |              |   |      |      |           |            |
| Gate Threshold Voltage                       | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$                            | -1   | -1.6 | -2.5      | V          |
| Drain-Source On-State Resistance             | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-2.0A$                                  | -    | 72   | 130       | m $\Omega$ |
|  |              | $V_{GS}=-4.5V, I_D=-1.5A$                                 | -    | 110  | 180       |            |
| Forward Transconductance                     | $g_{FS}$     | $V_{DS}=-10V, I_D=-2A$                                    | -    | 2    | -         | S          |
| <b>Dynamic Characteristics<sup>4</sup></b>   |              |   |      |      |           |            |
| Input Capacitance                            | $C_{iss}$    | $V_{DS}=-15V, V_{GS}=0V, F=1.0MHz$                        | -    | 226  | -         | PF         |
| Output Capacitance                           | $C_{oss}$    |   | -    | 47   | -         | PF         |
| Reverse Transfer Capacitance                 | $C_{rss}$    |   | -    | 28   | -         | PF         |
| <b>Switching Characteristics<sup>4</sup></b> |              |   |      |      |           |            |
| Turn-On Delay Time                           | $t_{d(on)}$  | $V_{DD}=-15V, R_L=15\Omega, V_{GS}=-10V, R_{GEN}=6\Omega$ | -    | 9    | -         | nS         |
| Turn-On Rise Time                            | $t_r$        |   | -    | 9    | -         | nS         |
| Turn-Off Delay Time                          | $t_{d(off)}$ |   | -    | 18   | -         | nS         |
| Turn-Off Fall Time                           | $t_f$        |   | -    | 6    | -         | nS         |
| Total Gate Charge                            | $Q_g$        | $V_{DS}=-15V, I_D=-2.0A, V_{GS}=-10V$                     | -    | 8.5  | -         | nC         |
| Gate-Source Charge                           | $Q_{gs}$     |   | -    | 2.3  | -         | nC         |
| Gate-Drain Charge                            | $Q_{gd}$     |   | -    | 1.5  | -         | nC         |
| <b>Drain-Source Diode Characteristics</b>    |              |   |      |      |           |            |
| Diode Forward Voltage <sup>3</sup>           | $V_{SD}$     | $V_{GS}=0V, I_S=-2.0A$                                    | -    | -    | -1.2      | V          |

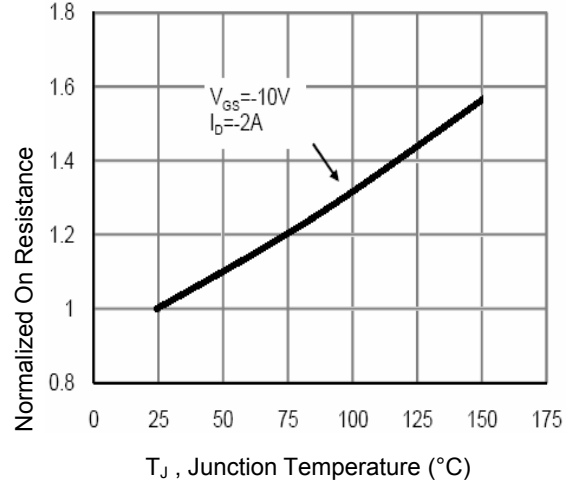
#### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design.

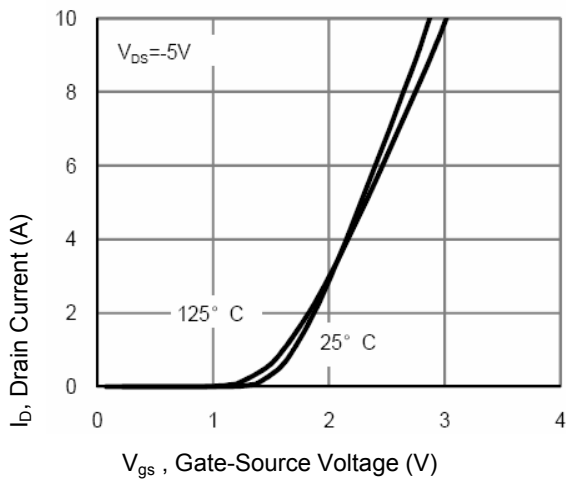
**Typical Electrical and Thermal Characteristic Curves**



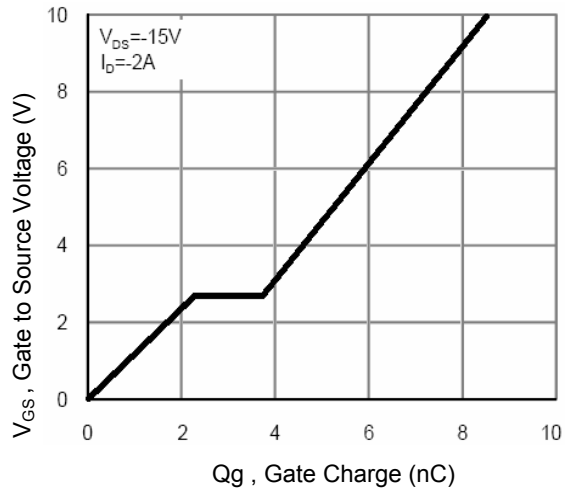
**Figure 1. Output Characteristics**



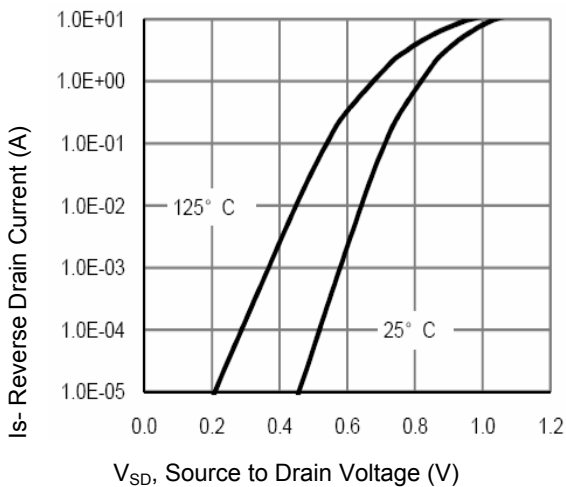
**Figure 2. Drain-Source On-Resistance**



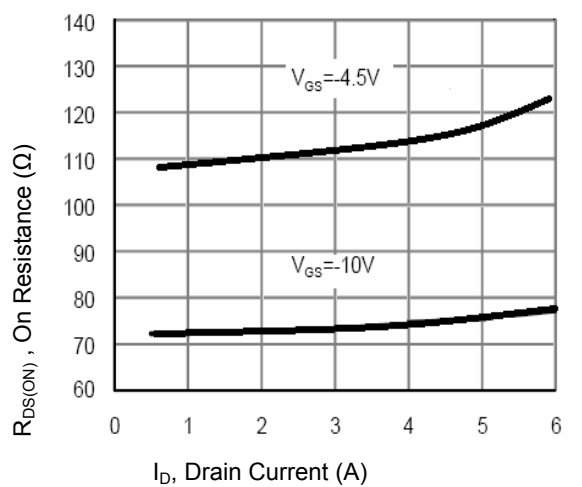
**Figure 3. Transfer Characteristics**



**Figure 4. Gate Charge Waveform**

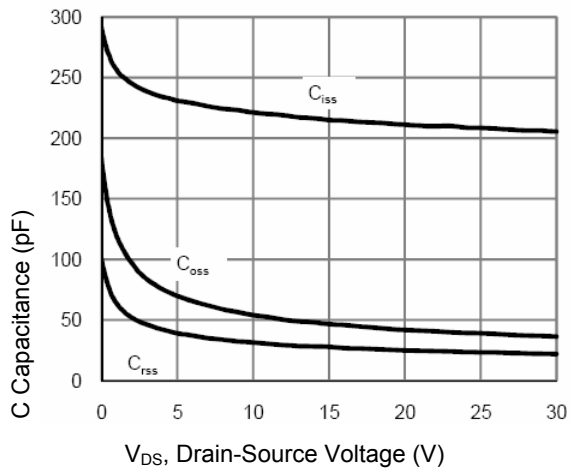


**Figure 5. Source-Drain Diode Forward**

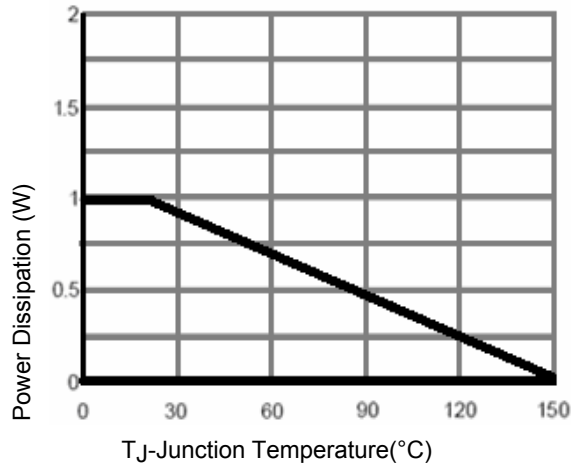


**Figure 6. Drain-Source On-Resistance**

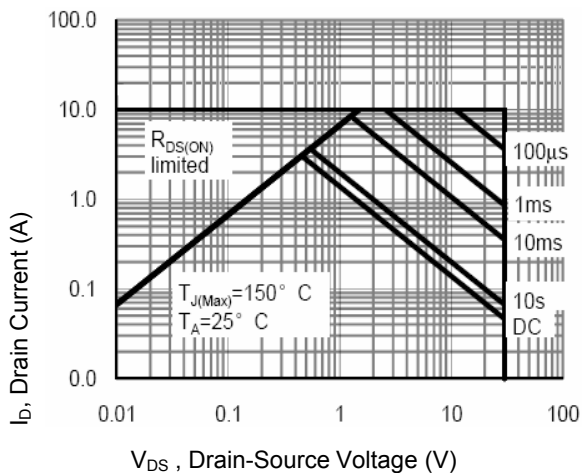
**Typical Electrical and Thermal Characteristic Curves**



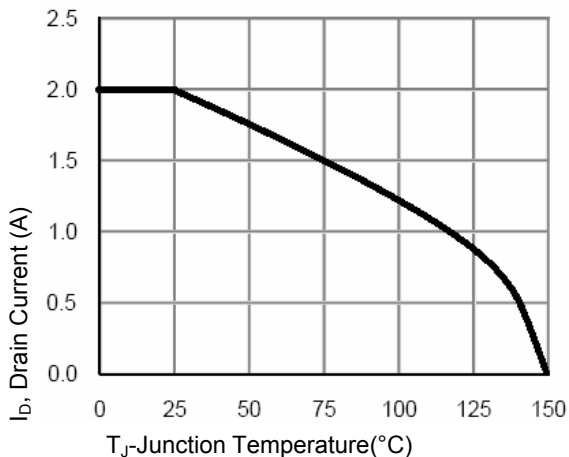
**Figure 7. Capacitance vs.  $V_{DS}$**



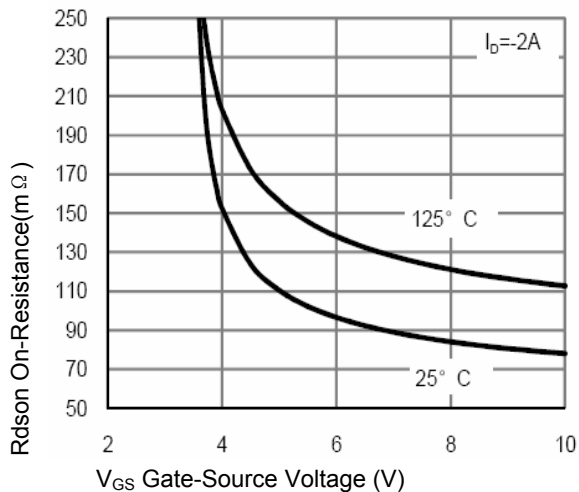
**Figure 8. Power De-rating**



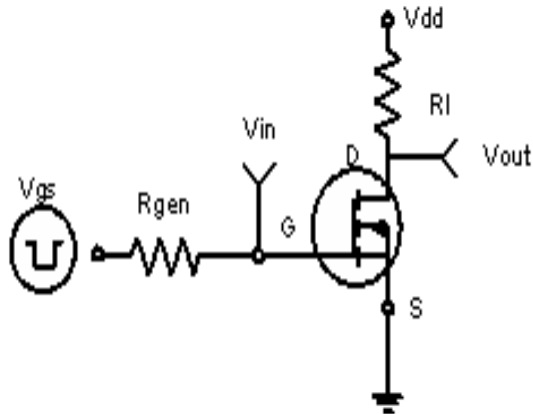
**Figure 9. Safe Operation Area**



**Figure 10. Drain Current**

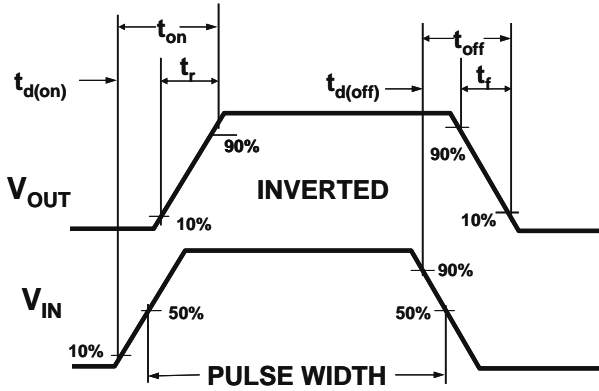


**Figure 11.  $R_{dson}$  vs  $V_{GS}$**

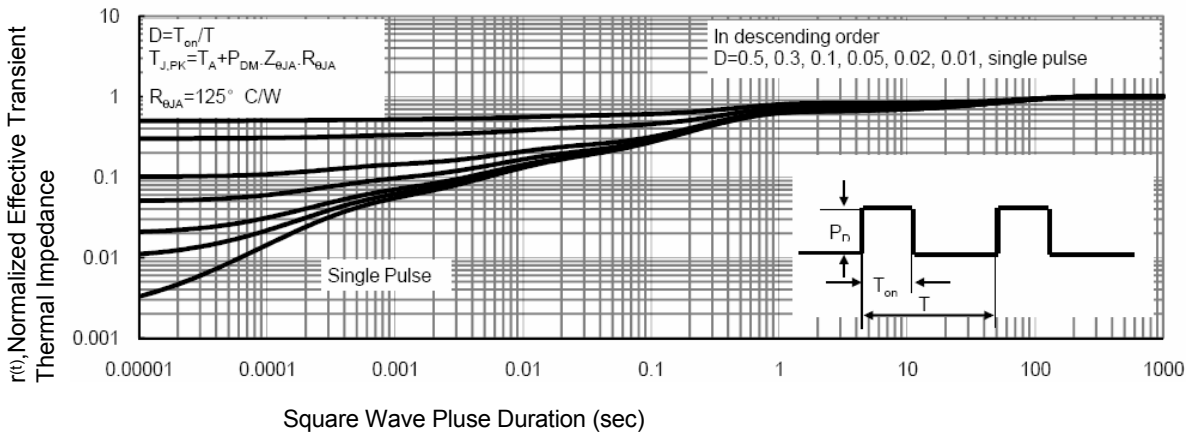


**Figure 12. Switch Time Test Circuit**

**Typical Electrical and Thermal Characteristic Curves**

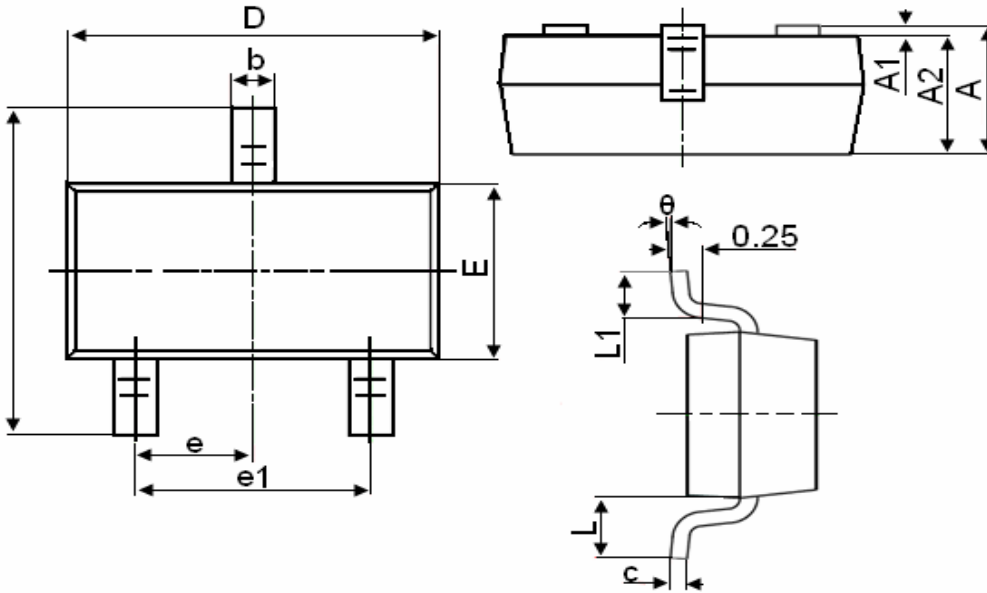


**Figure 13. Switching Waveforms**



**Figure 14. Normalized Maximum Transient Thermal Impedance**

## Package Outline Dimensions (SOT-23)



| Symbol | Dimensions in Millimeters |       |
|--------|---------------------------|-------|
|        | MIN.                      | MAX.  |
| A      | 0.900                     | 1.150 |
| A1     | 0.000                     | 0.100 |
| A2     | 0.900                     | 1.050 |
| b      | 0.300                     | 0.500 |
| c      | 0.080                     | 0.150 |
| D      | 2.800                     | 3.000 |
| E      | 1.200                     | 1.400 |
| E1     | 2.250                     | 2.550 |
| e      | 0.950TYP                  |       |
| e1     | 1.800                     | 2.000 |
| L      | 0.550REF                  |       |
| L1     | 0.300                     | 0.500 |
| θ      | 0°                        | 8°    |

### Notes

1. All dimensions are in millimeters.
2. Tolerance  $\pm 0.10\text{mm}$  (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.